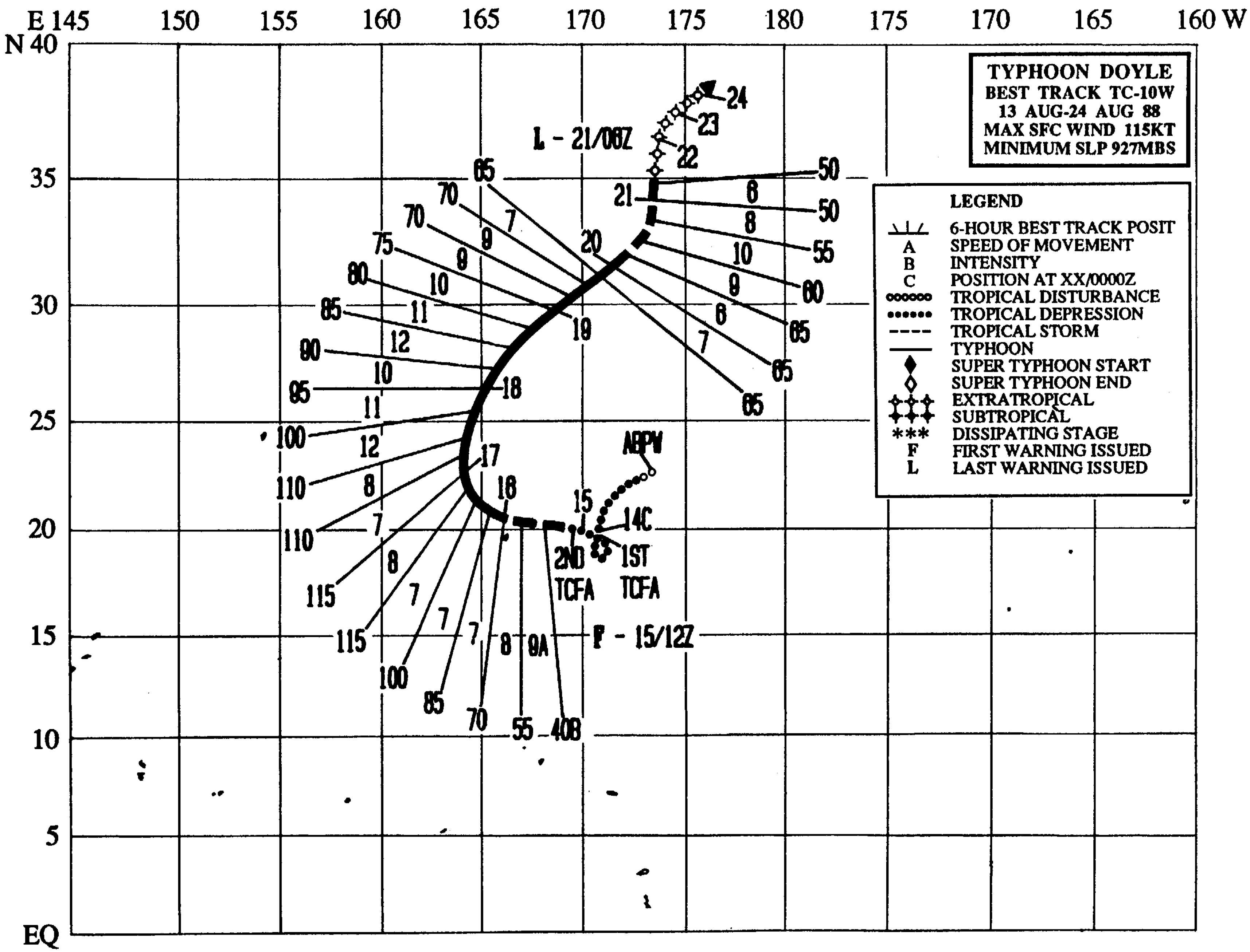
TYPHOON DOYLE
BEST TRACK TC-10W
13 AUG-24 AUG 88
MAX SFC WIND 115KT
MINIMUM SLP 927MBS
LEGEND
6-HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
SUBTROPICAL
DISSIPATING STAGE
F FIRST WARNING ISSUED
L LAST WARNING ISSUED
E 145
150
155
160
165
170
175
180
175
170
165
160 W
N 40
35
30
25
20
15
10
5
EQ
L - 21/06Z
F - 15/12Z
ABPW
2ND TCFA
1ST TCFA

TYPHOON DOYLE (10W)

Typhoon Doyle was the third of five tropical cyclones and the first of two typhoons to occur in the western North Pacific during August. In keeping with the aclimatological trend for the month, Doyle was no exception. It formed north of 20 degrees North latitude, moved south-southwestward and looped before tracking to the northeast.

On 12 August, as Tropical Storm Clara (09W) moved northward and weakened, a portion of the Central Pacific high moved in from the east to fill the void. The high pushed southwestward across the dateline. During the adjustment process, a low-level cloud vortex appeared along the leading edge of the flow and west of the remnants of Hurricane Fabio (08E). The unusual south-southwestward track of this vortex appeared to be related to the steering provided by a lower-tropospheric anticyclone to the north. The Significant Tropical Weather Advisory at 130600Z mentioned the vortex when deep convection became associated with the low-level cyclonic circulation. Throughout the night of the 13th and early morning hours of the 14th, the convection became centralized. This prompted a Tropical Cyclone Formation Alert at 140130Z. Visual and infrared imagery (Figure 3-10-1) at 140743Z implied a well developed low-level inflow. About this time

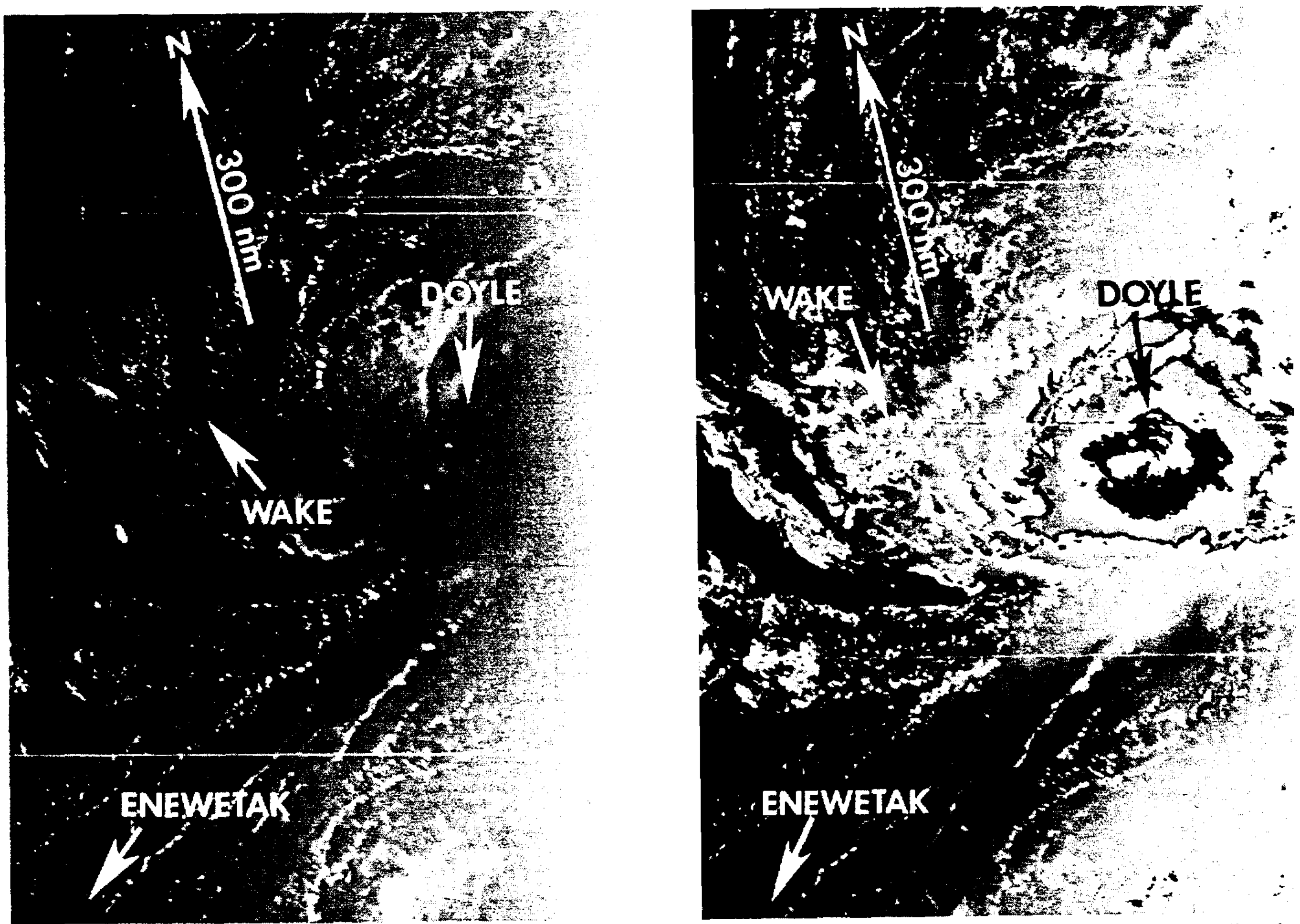

Figure 3-10-1. Satellite imagery of the suspect area (Doyle). Low-level circulation is implied by the lines of cumulus surrounding the center. The left picture is visual and the right is enhanced infrared (140743Z August DMSP visual and infrared imagery).

the system (Doyle) executed a small counterclockwise loop and began tracking west-northwestward. The potential for the system to develop remained good and a second Tropical Cyclone Formation Alert was issued at 150130Z.

The satellite intensity estimate of 40 kt (21 m/sec) maximum surface winds was followed at 151200Z by the first warning, when the system was 96 nm (178 km) east-northeast of Wake Island. For the 24-hour period from 151800Z to 161800Z (Figure 3-10-2) the intensity increased from 50 to 115 kt (26 to 59 m/sec). This was the equivalent of a sixty millibar pressure fall and met the criteria (Dunnavan, 1981) for explosive deepening. Although Doyle, which was close to becoming a compact typhoon, passed 55 nm (102 km) north of Wake Island (WMO 91245) at 152100Z, the island only experienced gusts to 40 kt (21 m/sec). As a result, the low-lying island incurred only minor damage.

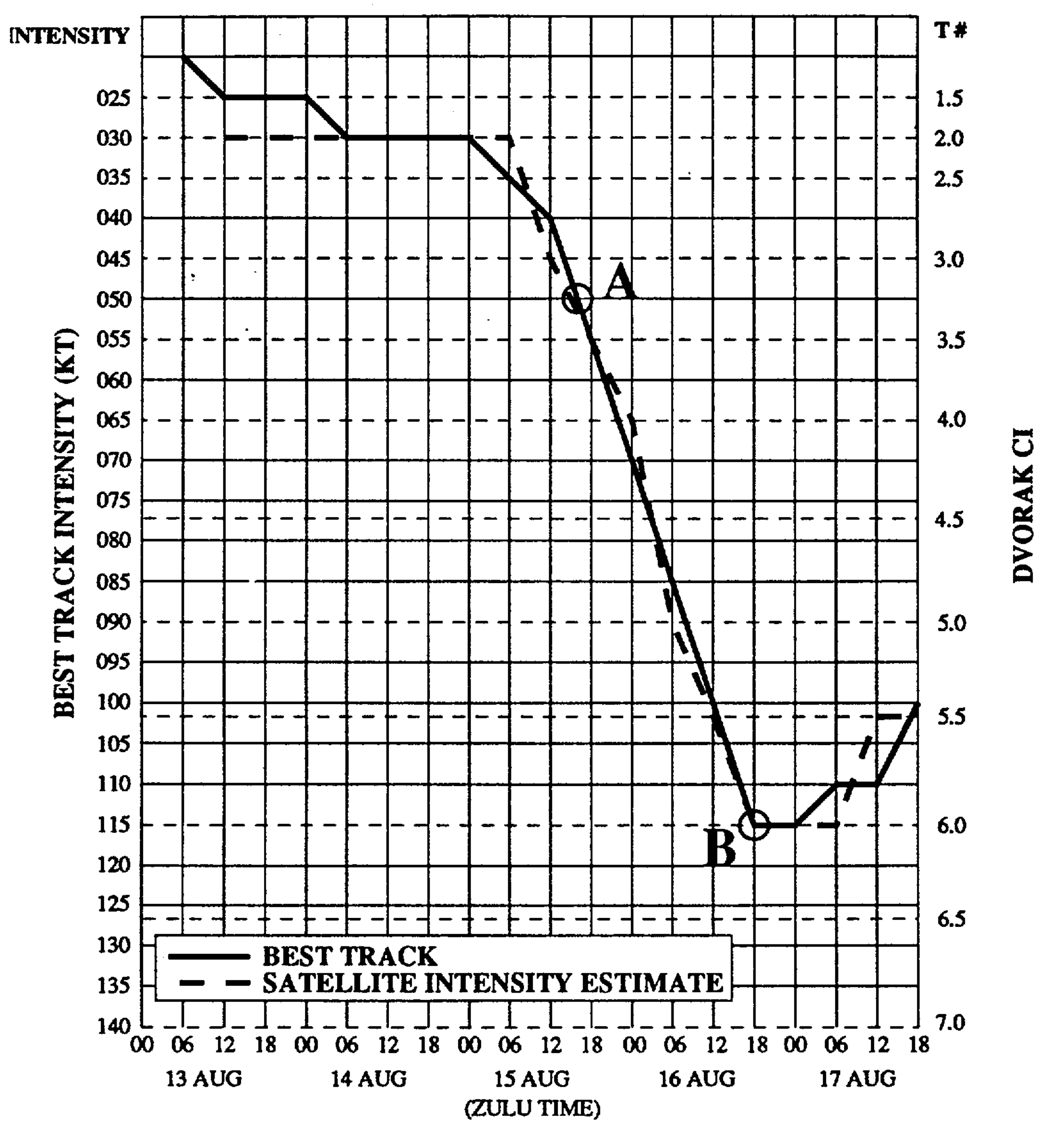

Figure 3-10-2. Time/intensity comparison of satellite intensity estimates for the Guam satellite site and the best track. Notice the extended period of explosive deepening of 30 mb/12-hours from 151800Z (point A) to 161800Z (point B).

Nearing the western periphery of the mid-level subtropical ridge, Doyle peaked in intensity at 161800Z (Figure 3-10-3) and assumed a northward track at 170000Z. To complicate the track forecasts, a TUTT cell stalled, then appeared to dissipate to the north. The main effect of the TUTT cell was to shield the tropical cyclone from strong mid- and upper-level westerlies. As a result, expected acceleration along the track didn't take place and Doyle's speed was never greater than 12 kt (22 km/hr). Doyle's track followed lower pressures and heights present between the subtropical ridge to the southeast and another high cell to the northwest centered near 42° North latitude.

After gradual weakening, Doyle was forecast to become extratropical as the convection began to move into the northeast semicircle at 180900Z. However, some central convection remained until 22 August. Doyle

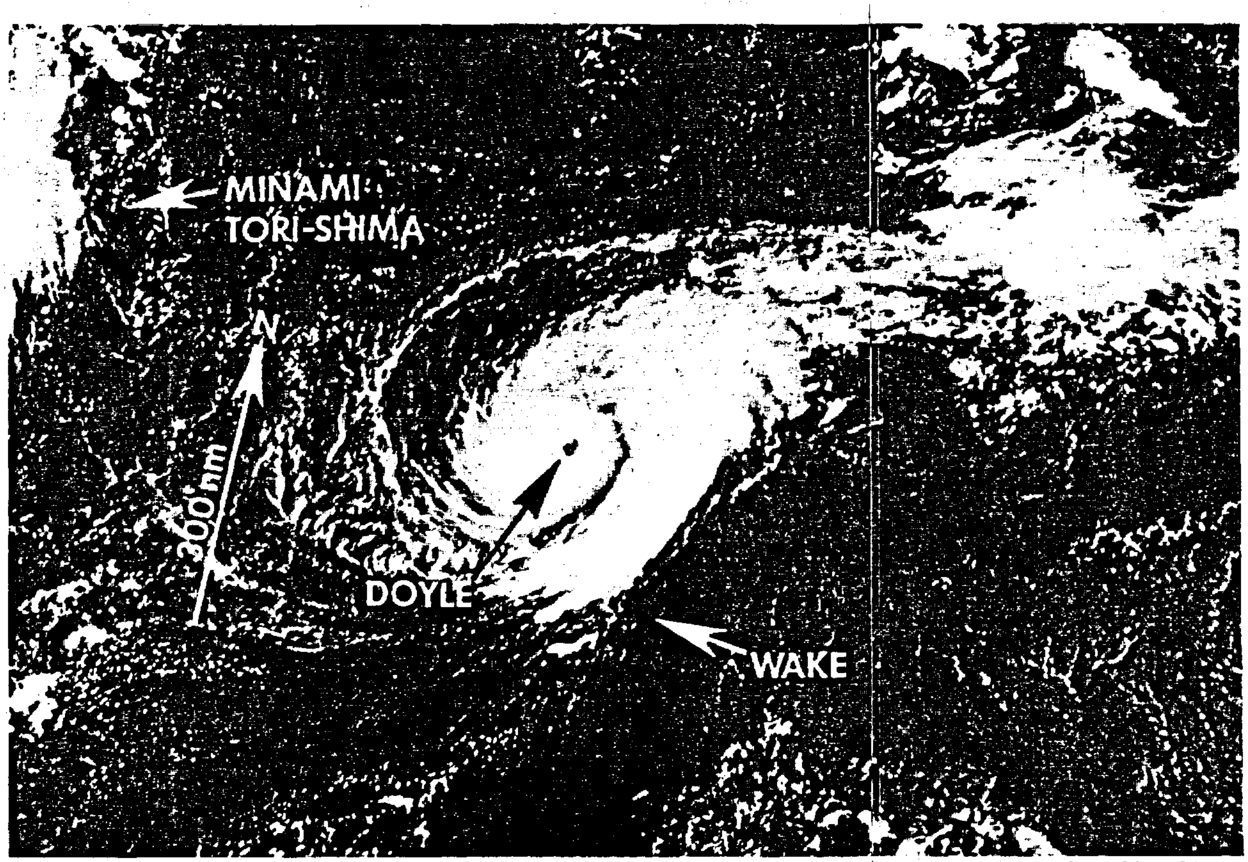

Figure 3-10-3. Satellite imagery of Typhoon Doyle at maximum intensity. The medium sized eye ranged from 20 to 30 nm (37 to 57 km) in diameter (162212Z August DMSP visual imagery).

dissipated over colder water as the system slowed and moved northeastward.

Doyle fell into the "other" track category for several reasons: rapid south-southwestward movement for 24-hours, looping and interaction with a TUTT cell while at typhoon intensity. Normally, tropical cyclone objective forecast guidance does not perform well for aclimatic systems. Figure 3-10-4 compares the final best track and the performance of the two best performing aids, CSUM and OTCM, up to the major track change at 170000Z. Although OTCM had the lowest mean forecast errors at 72-hour's of all the aids, it was slow in catching the major track change to the northeast. CSUM had the same problem predicting this track change.

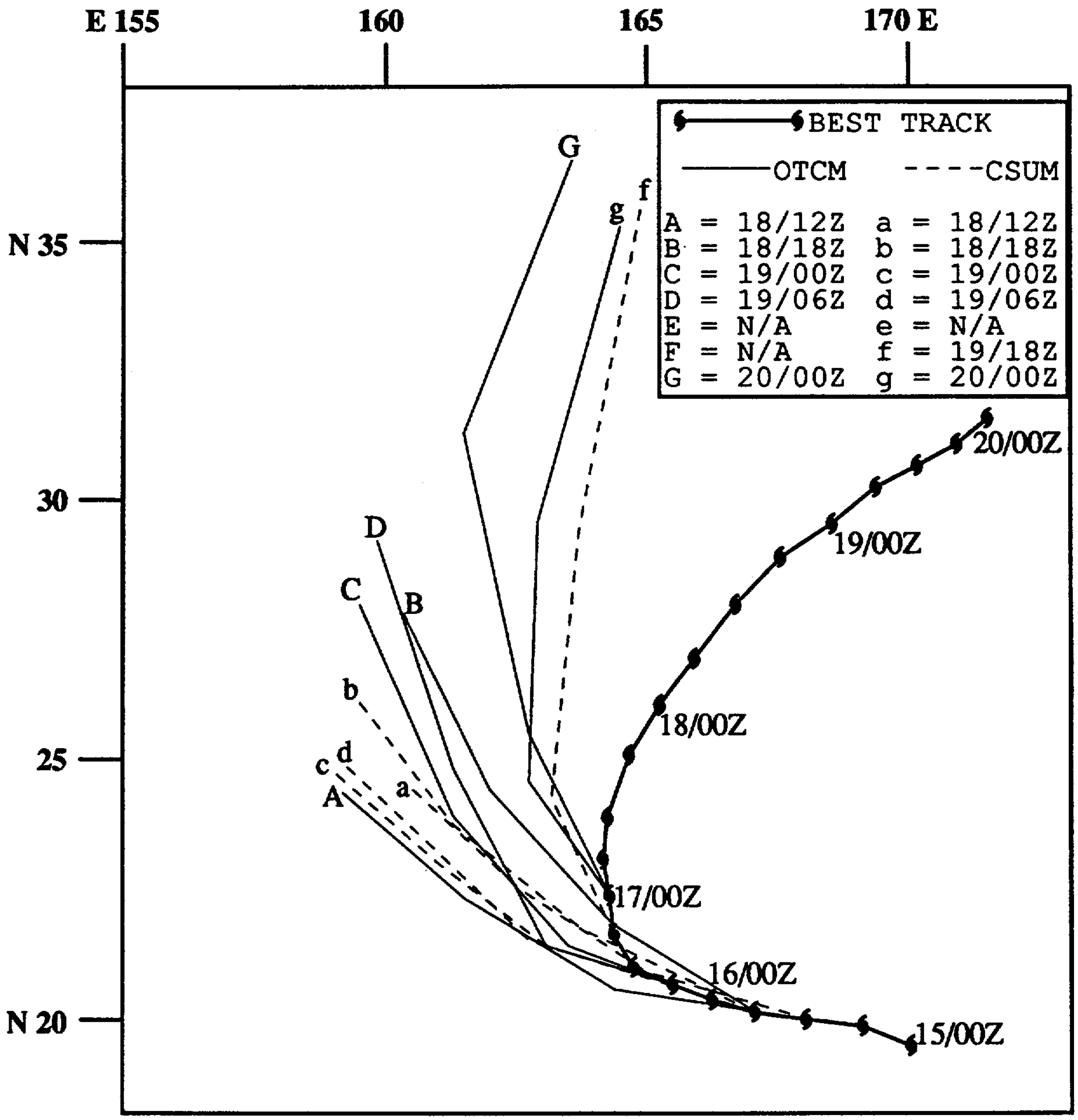

Figure 3-10-4. Graphical display of selected objective aids performance (OTCM and CSUM).